

Preparing Teacher Educators for Sustainable Agriculture and Food Security in Nigeria

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ABSTRACT

Agriculture is a cornerstone of Nigeria's economy, yet it faces challenges such as climate change, soil degradation, and population growth that threaten food security. Addressing these challenges requires the integration of sustainable agricultural practices, facilitated through education and training. Teacher educators play a critical role in this effort, as they prepare future educators to impart knowledge and skills essential for sustainability in agriculture. This paper examines the relationship between sustainable agriculture and food security, highlighting the gaps in Nigeria's agricultural education system, including outdated curricula, inadequate resources, and limited teacher preparedness. The paper calls for curriculum reform, capacity-building programs, and the integration of ICT to address these challenges. Furthermore, fostering collaboration between educational institutions, research organizations, and policymakers is essential for creating innovative solutions. By reforming teacher education, Nigeria can equip educators with the skills to promote sustainable farming practices, thereby enhancing food security and environmental resilience. The paper concludes with policy recommendations for strengthening agricultural education and achieving sustainability goals in Nigeria

INTRODUCTION

Agriculture remains a cornerstone of Nigeria's economy, providing employment and sustenance for a significant portion of the population. However, challenges such as climate change, soil degradation, and population growth threaten food security. Addressing these issues requires a shift towards sustainable agricultural practices, which hinges on effective education and training. Teacher educators are central to this process, as they prepare the teachers who will impart essential knowledge and skills to future generations.

Nigeria, as the most populous country in Africa, faces critical challenges in food security and sustainable agriculture, which are pivotal to its economic development and well-being. The integration of sustainable agricultural practices into the education system is essential for addressing food insecurity and fostering economic resilience. Teacher educators play a significant role in this process as they are responsible for equipping future agricultural educators with the skills, knowledge, and attitudes necessary to advance sustainable agricultural practices. This paper explores the strategies, challenges, and policy interventions for preparing teacher educators to meet the demands of sustainable agriculture and food security in Nigeria.

LITERATURE REVIEW

The Relationship Between Sustainable Agriculture and Food Security

Sustainable agriculture refers to farming practices that meet the present needs without compromising the ability of future generations to meet their own. It encompasses resource conservation, environmental stewardship, and socio-economic equity. Food security, as defined by the Food and Agriculture Organization (FAO), involves the availability, accessibility, and affordability of nutritious food for all. The synergy between these two concepts is critical for Nigeria, where agricultural productivity is often undermined by climate change, over-reliance on traditional farming methods, and inadequate education in sustainable practices (Olayide et al., 2021).

Current State of Agricultural Education in Nigeria

Despite the recognition of agriculture's importance, agricultural education in Nigeria faces several challenges:

1. **Curriculum Gaps:** The existing agricultural education curriculum often lacks comprehensive coverage of sustainable practices. Osagiede (2024) highlights the need for integrating sustainability concepts to address food security effectively.
2. **Teaching Methodologies:** Traditional lecture-based methods dominate agricultural education, limiting the development of practical skills. Umar and Daniel (2023) emphasize that demonstration methods are more effective in developing skills necessary for food security.
3. **Teacher Preparedness:** Many beginning teachers exhibit gaps in awareness and understanding of sustainability concepts. Ogunyemi et al., (2022) found that while there is interest in sustainability education, there is a significant knowledge gap among pre-service teachers

Role of Teacher Educators in Promoting Sustainable Agriculture

Teacher educators are key in shaping the agricultural education curriculum and mentoring future teachers who will in turn influence farmers and rural communities. They are responsible for imparting knowledge about sustainable agricultural practices, promoting awareness of environmental conservation, and instilling skills for innovation in agriculture. Therefore, the preparation of teacher educators must align with the principles of sustainability and address the country's agricultural challenges. Their responsibilities include:

1. Training pre-service teachers on sustainable farming techniques.
2. Developing research-based teaching materials that emphasize environmental conservation and resource management.
3. Promoting community-based learning experiences that connect students with real-world agricultural challenges.

Challenges in Preparing Teacher Educators for Sustainable Agriculture

The preparation of teacher educators in Nigeria is fraught with several challenges:

1. **Inadequate Training and Resources** Many teacher educators lack sufficient training in modern and sustainable agricultural practices. The outdated curriculum, limited access to technological tools, and absence of hands-on training opportunities undermine the effectiveness of teacher education programs (Abdullahi and Ibrahim, 2020).
2. **Policy Gaps** Policy frameworks in Nigeria often fail to prioritize sustainable agriculture in teacher education. Without clear guidelines and adequate funding, teacher educators are unable to develop the competencies needed to address the realities of sustainable farming (Eze, 2019). Inconsistent policies and insufficient funding for agricultural education undermine efforts to prepare teacher educators adequately.
3. **Limited Research and Collaboration** Research on sustainable agriculture in Nigeria is still nascent, and there is limited collaboration between educational institutions, agricultural research centers, and industries. This disconnect hinders the development of innovative teaching methods and materials for teacher educators (Oluwasola, 2020). Weak linkages between universities, research institutions, and agricultural extension services hinder knowledge transfer and innovation.
4. **Socio-Cultural Barriers** The adoption of sustainable practices often conflicts with traditional farming methods that are deeply rooted in Nigeria's cultural heritage. Teacher educators must navigate these cultural dynamics while promoting modern, sustainable practices (Akinyele, 2021).
5. **Outdated Curricula** often fail to reflect modern agricultural practices and sustainability principles, limiting the effectiveness of teacher educators.
6. **Resource Constraints** Limited funding and infrastructure can hinder the implementation of comprehensive training programs and curriculum reforms. Securing adequate resources is essential for effective capacity building.
7. **Resistance to Change** Some educators may be resistant to adopting new methodologies or integrating unfamiliar content. Addressing this requires

change management strategies and highlighting the benefits of proposed changes.

8. **Policy Inconsistencies:** Inconsistencies in educational policies can create confusion and impede progress. Ensuring alignment between national policies and institutional practices is crucial for coherent implementation.

METHODOLOGY

To address these challenges, a multi-pronged approach is needed.

1. **Curriculum Reform** The agricultural education curriculum should be overhauled to incorporate sustainable practices, climate-smart agriculture, and technological innovations. Topics such as organic farming, agroforestry, and resource management should be prioritized. Teacher educators must also be trained to use innovative pedagogical approaches such as experiential learning and problem-based teaching (Ajayi et al., 2022).
2. **Capacity Building Programs** Regular workshops, seminars, and certification programs should be organized for teacher educators to enhance their knowledge and skills in sustainable agriculture. These programs should focus on modern farming technologies, climate change adaptation, and community engagement strategies (Okoro et al., 2020).
3. **Integration of ICT in Agriculture Education** Information and Communication Technology (ICT) plays a transformative role in modern agriculture. The use of e-learning platforms, mobile applications, and digital tools for precision agriculture should be integrated into teacher education programs. Teacher educators must be trained to leverage these technologies to facilitate learning and innovation among their students (Adekunle and Olorunfemi, 2021). The use of digital tools and platforms can enhance agricultural education. E-learning resources, mobile applications, and online training modules can provide teacher educators with flexible and cost-effective learning opportunities.
4. **Strengthening Research and Collaboration** Collaborative partnerships between universities, agricultural research institutes, and the private sector can drive innovation in teacher education. Joint research projects, internships, and knowledge-sharing initiatives can bridge the gap between academic learning and practical application (Oladimeji et al., 2023). Collaboration between educators, researchers, and policymakers is vital for creating a comprehensive approach to sustainable agriculture. Partnerships with organizations such as the International Institute of Tropical Agriculture (IITA) can provide teacher educators with access to cutting-edge research and practical tools.
5. **Policy and Institutional Support** Government policies should prioritize funding for sustainable agricultural education and provide incentives for teacher educators to pursue advanced training. Institutional reforms are also necessary to create an enabling environment for effective teacher education programs (Edeh and Okafor, 2018).

RESULTS AND DISCUSSION

Case Studies and Best Practices

Several initiatives in Nigeria provide valuable insights into the preparation of teacher educators for sustainable agriculture. The Agricultural Education Training Initiative (AETI) has been instrumental in providing hands-on training and resources for teacher educators. Similarly, the National Agriculture Extension and Research Liaison Services (NAERLS) has contributed to capacity building through workshops and outreach programs. These initiatives highlight the importance of stakeholder engagement and continuous professional development in teacher education.

Recent studies and initiatives in Nigeria highlight successful approaches to preparing teacher educators for sustainable agriculture:

1. **Integration of Sustainability into Curricula:** The Federal College of Education (Technical), Akoka, has introduced courses on sustainable agriculture, equipping teacher educators with the knowledge to train pre-service teachers on environmentally friendly farming practices.
2. **Partnerships with Research Institutions:** Collaboration between universities and institutions such as the Nigerian Institute for Social and Economic Research (NISER) has facilitated the development of innovative teaching materials and methods.
3. **Use of Demonstration Farms:** Demonstration farms, such as those established by Obafemi Awolowo University, provide teacher educators and students with hands-on experience in sustainable farming.

Implications for Food Security

The effective preparation of teacher educators has far-reaching implications for food security in Nigeria. By equipping future teachers with the tools to promote sustainable practices, the agricultural sector can witness increased productivity, reduced environmental degradation, and enhanced resilience to climate change. Moreover, well-trained teacher educators can inspire innovation and entrepreneurship among their students, leading to the development of sustainable agribusiness ventures (Ogunleye and Alabi, 2022).

CONCLUSIONS

Preparing teacher educators for sustainable agriculture and food security in Nigeria is a critical step towards achieving the country's development goals. It requires a holistic approach that combines curriculum reform, capacity building, policy support, and research collaboration. By addressing the challenges and implementing the recommended strategies, Nigeria can empower teacher educators to drive sustainable agricultural practices, thereby ensuring food security and economic prosperity. By reforming curricula, building capacity, fostering collaboration, and leveraging technology, teacher educators can be empowered to train the next generation of agricultural leaders. As the studies by Osagiede and Alordiah (2024) demonstrate, a holistic approach to agricultural education is essential for achieving sustainability and food security in Nigeria.

RECOMMENDATIONS

To enhance the preparation of teacher educators, the following policy recommendations are proposed:

1. **Increased Funding:** Allocate more resources to agricultural education programs, including teacher training institutions.
2. **Policy Alignment:** Ensure alignment between national agricultural policies and education policies to promote sustainability.
3. **Monitoring and Evaluation:** Implement mechanisms to monitor and evaluate the effectiveness of teacher training programs.
4. **Incentives for Teacher Educators:** Provide financial and professional incentives to encourage teacher educators to pursue advanced training in sustainable agriculture.

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